

DISTRICT ACCOMPLISHMENTS SINCE THE 1995 DWMP

The District, in its 1995 DWMP (SFWMD, 1995a), established an ambitious schedule of activities. This schedule called for activities in each area of responsibility in the years following the plan's acceptance. The District has, for the most part, adhered to the schedule of activities described in the original DWMP (**Table 5**). DWMP Annual Reports (SFWMD, 1996, 1997a, 1998a) have included the status of the projects described in the 1995 DWMP. The status of activities for FY2000 is described below.

The 1995 DWMP described 54 District activities that would be under way or completed by the end of FY2000. Of these, 14 are ongoing activities with no fixed end date. Of the remaining 40 activities, two have been superseded or canceled and 23 have been completed. The District is continuing to work on the remaining 15 activities. Nine activities are behind the schedule that was described in the 1995 DWMP, while the remaining six activities are on schedule. If compliance is considered to be one minus the proportion of activities behind schedule, then this represents a compliance rate of 68 percent in 1996, 70 percent 1997, 73 percent in 1998, 70 percent in 1999, and 83 percent in 2000 with the schedule established in the 1995 DWMP.

Among the 54 activities, one group of projects has had schedule adjustments outside of the DWMP process. The District, with approval from the FDEP, developed MFLs Priority Lists and Schedules in December 1998 and 1999. These lists and schedules comply with legislation passed in 1997. Each year's list and schedule include revised schedules for the development of MFLs for water bodies within the District. This is an annual list that maybe changed each year.

If these revised schedules for establishing MFLs are considered (rather than the schedule established in the 1995 DWMP) then the present rate of successful compliance would rise to 93 percent. Brief activity summaries are included in each of the DWMP annual reports (SFWMD, 1996, 1997a, 1998a).

CHANGES IN DISTRICT EMPHASIS SINCE THE 1995 DISTRICT WATER MANAGEMENT PLAN

Coordination between water management districts has been emphasized since the 1995 DWMP. The District has formalized several agreements with the state's other water management districts. These include agreements regarding water resource investigation, planning, regulation, natural systems management, and water shortage declarations. The outlines for several planning efforts, including this DWMP, were coordinated with the other water management districts and the FDEP.

The policies and direction of the District are driven by natural resource needs as interpreted by legislation, and have reinforced the District's efforts and emphasis on its six priority projects. Major water resource legislation since 1994 is described in **Appendix A**.

Table 5. Summary of Activities Since the 1995 DWMP.

Activity		Status
Water Supply		
1	Water Use Permitting	Ongoing
2	Conservation Program	Ongoing
3	LEC Regional Water Supply Plan	Complete
4	LWC Water Supply Plan	Complete
5	UEC Water Supply Plan	Complete
6	Kissimmee Basin Water Supply Plan	Complete
7	Northwest Dade Lake Belt Plan	Complete
8	Glades/Highlands County Ground Water Reconnaissance	Behind Schedule
9	Okeechobee Regional Water/Sewer Infrastructure	Complete
10	Recharge Mapping	Complete
11	Prime Recharge Designation	Complete
12	Wellhead Protection Program	Ongoing
Flood Protection		
13	Canal Conveyance Capacity Study	Complete
14	Key West Storm Water Retrofits	Ongoing
15	Western C-9 Detailed Design Workshop	Complete
16	Big Cypress Basin Assessment (Watershed Management Plan)	Complete
17	Watershed Interactive Network	Complete
18	Lake Istokpoga Study	Complete
19	Okeechobee County Surface Water Management	Complete
20	Boggy Creek Drainage Study	Complete
Water Quality		
21	Water Quality Monitoring	Ongoing
22	Everglades Surface Water Improvement Management (SWIM)	N/A ^a
23	Everglades Program	On Schedule
24	Upper Kissimmee Chain of Lakes Plan	Behind Schedule
25	Biscayne Bay SWIM	Complete
26	Lake Okeechobee SWIM	Complete
27	Florida Keys Water Quality Plan	On Schedule
28	Florida Keys National Marine Sanctuary Water Quality Program	Ongoing
29	Florida Bay Water Quality Program	Complete
30	Indian River Lagoon SWIM	Complete
31	Miami River Water Quality Commission	Complete
32	Moore Haven Wastewater Feasibility Study	Complete
Natural Systems Management		
33	Environmental Resource Permitting	Ongoing
34	Save Our Rivers Acquisitions	Ongoing
35	Aquatic Plant Maintenance	Ongoing
36	Melaleuca Task Force	Ongoing
37	Exotic Plant Control	Ongoing

Table 5. Summary of Activities Since the 1995 DWMP.

Activity		Status
38	C&SF Project Comprehensive Review Study (Restudy)/ Comprehensive Everglades Restoration Plan (CERP)	On Schedule ^b
39	Restudy/Indian River Lagoon	Behind Schedule
40	East Coast Buffer/Water Preserve Areas	On Schedule
41	Kissimmee River Restoration	On Schedule
42	Florida Keys Advanced Identification	Ongoing
43	Florida Panther Wildlife Refuge Protection	Ongoing
44	Taylor Slough Demonstration Project	Complete
45	Lake Okeechobee MFLs	Behind Schedule ^c
46	Big Cypress National Preserve	N/A ^a
47	Caloosahatchee Estuary	Behind Schedule ^c
48	Biscayne Aquifer	On Schedule
49	Loxahatchee Estuary MFLs ^d	Behind Schedule ^c
	St. Lucie Estuary MFLs ^d	Behind Schedule ^c
	UEC Florida Aquifer MFLs ^d	N/A ^a
50	Everglades MFLs	Behind Schedule ^c
51	Florida Bay MFLs	Behind Schedule ^c
52	LWC Surficial Aquifer System MFLs	Behind Schedule
General Activities		
53	Comprehensive Plan Review	Ongoing
54	Lake Okeechobee Detailed Design Workshops	Complete

- a. N/A indicates that the activity has been superseded or canceled.
- b. The Restudy was submitted to Congress on July 1, 1999; The CERP is on schedule.
- c. Activity rescheduled with FDEP approval and is on the new schedule.
- d. The Loxahatchee Estuary, St. Lucie Estuary, and UEC Floridan Aquifer MFL activities are jointly listed in all DWMP annual reports.

The SFWMD has identified six major efforts as being its main priorities at present and into the foreseeable future. The District has intensified its efforts on those projects since the 1995 DWMP. These efforts are described below (the order does not imply priority level):

- Operation, Maintenance, and Modernization of the C&SF Project
- Regional Water Resource Planning and Implementation
- Kissimmee River Basin Restoration
- Lake Okeechobee Restoration
- Everglades and Florida Bay Restoration
- Comprehensive Everglades Restoration Plan (CERP) (i.e., implementation of the C&SF Project Comprehensive Review Study)

Operation, Maintenance, and Modernization of the C&SF Project

The C&SF Project was designed following the 1947 flood, and the majority of its structures were built in the 1950s and early 1960s. The C&SF Project consists of 292 primary water control structures, 27 pump stations, 1,800 miles of canals, and 2,000 secondary structures. The components of the C&SF Project (which are further described in **Chapter 4**) typically range in age from 30 to 50 years. Due to the age of this infrastructure, the District annually allocates capital funds for the maintenance necessary to provide flood control and water supply readiness. These funds are allocated in the form of individual projects that target major components of the C&SF Project. The projects include improvements and upgrades through automation; pump station repair and restoration; gravity structure repair and restoration; levee repair; and canal conveyance dredging. These funds are not used for capital expansion. Typically, elements of large restoration projects such as the Everglades Construction Project and Kissimmee River Restoration are addressed as separately funded programs.

The C&SF Project system design was based on projected land uses that were primarily agricultural. When the C&SF Project was designed, its primary function was flood protection and water control. The C&SF Project provided additional benefits to water supply, fish and wildlife preservation, and other functions. Since the construction of the C&SF Project, the District's responsibilities have expanded to emphasize other aspects of water resource management. The operational goals have become broader and more complex than the system was originally designed to meet, resulting in the C&SF Project being pushed beyond its original design objectives.

In addition to the canal network and the corresponding structures (spillways, culverts, weirs, and pump stations) required to operate it, the C&SF Project includes Lake Okeechobee and the three WCAs. Lake Okeechobee has a surface area of 730 square miles and a maximum storage capacity of 1.05 trillion gallons (SFWMD, 1997b). The WCAs are set aside for water storage, natural system preservation, and fish and wildlife benefits.

The District presently operates and maintains the C&SF Project to accomplish the following objectives:

- Ensure the reliability and integrity of the system, through routine inspection, maintenance, and replacement of system components (i.e., water control structures, levees, canals)
- Optimize flood protection, water supply, and natural system benefits
- Improve the District's operational ability to anticipate and respond to the water resource management demands on the system, using the best available science and technology

The District has developed and implemented an effective maintenance and modernization program that is continuously evaluated and upgraded. This program has allowed the original components of the C&SF Project to remain in operation.

Realistically, many of the components have met, or are nearing the end, of their design life cycle. Examples include electrical systems and engines of the pump stations, secondary inflow culverts (project culverts) that were installed nearly 40 years ago, and the canals themselves that have accumulated sediment over the past 40 to 50 years.

Much progress is being made through selected projects using limited resources. The principle components of the pump station electrical systems, as of October 1999, have been almost completely replaced. The Canal Conveyance Capacity Program and other multiyear projects are currently in progress. The completion of these and other projects will provide operational reliability for the C&SF Project.

Regional Water Resource Planning and Implementation

This priority includes all water management planning and the implementation of those plans, including this DWMP. Within this category, water supply planning is presently the District's focus. However, the District also has planning efforts that address water quality, flood control, and natural systems. Previous water supply planning efforts by the District include the following: the *Water Supply Needs and Sources Document 1990-2010* (SFWMD, 1992a); the DWSA (SFWMD, 1998b), the *Lower West Coast Water Supply Plan* (SFWMD, 2000c); the *Interim Plan for Lower East Coast Regional Water Supply Plan* (SFWMD, 1998c); the *Lower East Coast Regional Water Supply Plan* (SFWMD, 2000b) the *Upper East Coast Water Supply Plan* (SFWMD, 1998d); the *Kissimmee Basin Water Supply Plan* (SFWMD, 2000a). With the exception of the *Upper East Coast Water Supply Plan*, these planning efforts have had a future planning horizon through 2010. In many cases, however, the demand levels analyzed far exceed the current 2010 projections due to the slowing of population and irrigated agricultural acreage growth rates.

During the 1997 legislative session, significant amendments were made to the Florida Water Resources Act of 1972 (Chapter 373, F.S.) regarding regional water supply planning. Section 373.036(2)(b)4, F.S., required each water management district to prepare a districtwide water supply assessment, and to then prepare water supply plans for regions that are anticipated to have the potential of demand outstripping available supply by 2020. These regional water supply plans identify specific geographical areas that have water resource problems that are critical or are anticipated to become critical by 2020. For these critical areas, the regional plans detail remedial or preventive measures including water resource development projects, water supply development projects, and operational and regulatory strategies. The regional plans also serve as a means of identifying areas where collection of resource data and technical studies are necessary.

The District has committed to preparing water supply plans for each of its four planning regions, which cumulatively cover the entire District. Water supply plans for the planning regions have been sequenced based on the history of water shortage problems in each region. The LWC was the first to be initiated, followed by plans for the LEC, UEC and the Kissimmee Basin. Each plan was developed in conjunction with an advisory committee composed of interested parties and chaired by a Governing Board member.

The District's water supply planning status for the four planning regions is as follows:

- The *Lower West Coast Water Supply Plan* (SFWMD, 2000c) was completed in 2000.
- The *Interim Plan for Lower East Coast Water Supply* (SFWMD, 1998c) was completed in 1998. The analyses within this document was expanded in the *Lower East Coast Regional Water Supply Plan* completed in 2000 (SFWMD, 2000b).
- The *Upper East Coast Water Supply Plan*, meeting the full water supply planning requirements of Chapter 373, F.S., was completed in 1998, and is currently being implemented.
- The *Kissimmee Basin Water Supply Plan* was completed in 2000.

In addition to the regional water supply plans, the District has also initiated the development of several subregional plans. Subregional planning efforts that are being initiated by the District include the *Caloosahatchee Water Management Plan*, the *North Palm Beach County Comprehensive Water Management Plan*, the *Southeast Palm Beach County Integrated Water Resource Strategy*, and the *Eastern Broward County Integrated Water Resource Plan*.

Water quality planning efforts by the District include Surface Water Improvement and Management (SWIM) plans as well as non-SWIM plans that address water quality. Since the SWIM program was initiated in 1987, the District has prepared a priority list of all water bodies within the District. SWIM plans have been developed for the Indian River Lagoon (SFWMD and SJRWMD, 1994), Lake Okeechobee (SFWMD, 1997b), Biscayne Bay (SFWMD, 1995b), and the Everglades (SFWMD, 1992b). The Everglades SWIM Plan was superseded by the Everglades Forever Act. In addition to improvement of water quality SWIM plans have also identified needs for restoration of natural ecosystem functions within the target water bodies. Since 1995, legislative appropriations for the SWIM Program have declined significantly, although the mandate to conduct the program still exists. In addition to SWIM plans, a water quality plan has been developed for the Florida Keys, and a water management plan that addresses water quality is presently being developed for the Kissimmee Chain of Lakes. Flood protection plans have been developed by the District in the past, but presently the only flood plans being prepared are for the Big Cypress Basin and for southern Lee County, although several other planning efforts consider flooding impacts.

District natural system planning efforts include the natural system restoration components of the C&SF Project Comprehensive Review Study (Restudy) and the CERP; the development of MFLs (which are a subset of the regional water supply planning efforts); the development of rainfall-driven schedules for the Everglades; establishing economic and hydrologic needs for the Everglades Protection Area; the South Miami-Dade County Integrated Water Resource Strategy; SWIM Plans; and land management plans for District holdings.

Kissimmee River Basin Restoration

Between 1962 and 1971, as part of the C&SF Project, the meandering Kissimmee River and flanking floodplain were channelized and transformed into a 30-foot deep central drainage canal (C-38), which was compartmentalized with levees and dam-like water control structures into a series of five pools. Channelization was done primarily to provide an outlet canal for draining floodwaters from the developing Upper Kissimmee Basin, but also to provide flood protection for lands adjacent to the river. The construction of the C-38 Canal took 10 years and satisfied the need for greater flood protection throughout the Kissimmee River Basin. But even before the work was complete, area residents and naturalists realized the channelization had destroyed valuable fish and wildlife habitat. Ninety percent of the wading bird population was lost, as was more than 70 percent of the nesting habitat for bald eagles. The once rich fishery was replaced by increasingly dominant populations of rough fish (i.e. fish species considered to be of poor fighting quality when taken on tackle or of poor eating quality).

The Kissimmee River restoration initiative began as a grassroots movement during the latter stages of channelization when concerned citizens and members of the environmental community voiced concerns regarding perceived environmental impacts of the flood control project. Subsequent studies documented the nature of these impacts to the Kissimmee River and its surrounding ecosystem, including the loss of 30,000 to 35,000 acres of wetlands, a major reduction in wading bird and waterfowl usage, and a continuing long-term decline in game fish populations.

These impacts provided the impetus for over 20 years of state and federally mandated restoration related studies, which culminated in the development of a restoration plan that was authorized for implementation as a state-federal partnership in the 1992 Water Resources Development Act. The restoration project will restore over 40 square miles of river and associated floodplain wetlands, and will benefit over 320 fish and wildlife species, including the endangered bald eagle, wood stork, and snail kite.

This will be accomplished by restoring 43 contiguous miles of the 56-mile long flood control canal, and removing two of the five water control structures within this reach of backfilled canal. Spoil banks composed of excavated sand and shell from the original channelization, which occur along the canal, will provide the source of this backfill material. Another important component of the restoration project is to modify the timing of water inflows to the river from the Kissimmee Chain of Lakes. This will be accomplished by raising the high water level in Lakes Kissimmee, Hatchineha and Cypress one foot higher than is currently allowed. This additional storage will provide the ability to reestablish continuous inflows and a more natural seasonal pattern of high and low flows to the restored river.

The total cost of the restoration project is estimated at \$490 million, which will be equally cost-shared by the State of Florida and the federal government. Most of the state's fiscal responsibility will occur as land acquisition, through funds provided by the SOR and Preservation 2000 programs. The federal portion of the project cost will be provided

through annual budgetary appropriations. The first phase of canal backfilling began in the summer of 1999, and reconstruction is scheduled to be completed in 2011.

Reestablishment of floodplain wetlands and the associated nutrient filtration function is expected to result in decreased nutrient loads to Lake Okeechobee. It is also possible that restoration of the Kissimmee River floodplain could benefit populations of key avian species, such as wading birds and waterfowl, throughout South Florida by providing increased feeding and breeding habitat and refuge during adverse conditions.

Lake Okeechobee Restoration

Lake Okeechobee is the largest lake in Florida and the key surface water component of the South Florida ecosystem. The lake is extensively managed for flood control, water supply, and recreation, and past water management decisions have significantly impacted the lake and its associated downstream ecosystems (e.g. the Everglades, the Caloosahatchee River and Estuary and the St. Lucie River and Estuary). The initial lowering of its water level and the construction of an encompassing dike greatly modified Lake Okeechobee. These actions reduced its size and isolated it from its original extensive, dynamic system of littoral zone and floodplain. As a result of the managed water levels that existed between the early 1950s to the late 1970s, a new diverse 150-square mile littoral marsh was formed within the now well-defined 730-square mile lake.

Continuing ecosystem problems in Lake Okeechobee are primarily a result of nutrient runoff from ranching, dairy, and agricultural lands; a lake regulation schedule which places water supply and flood control concerns ahead of the ecological health of the lake; and invasion by exotic plants. High water levels and excessive phosphorus inputs have contributed to a significant degradation of the health of the native flora and fauna in Lake Okeechobee. Since 1978, when the regulation schedule for the lake was raised, frequent long periods of high water levels have resulted in significant changes in the native vegetation in the lake's large littoral zone. Excessive phosphorus inflows have increased the in-lake phosphorus concentrations, and contributed to more frequent damaging algal blooms. Major increases have occurred in the populations of blue-green algae and pollution-tolerant, bottom-dwelling animals. Also, sediment has accumulated in the lake that has exacerbated this problem. Exotic plants have displaced large areas of native vegetation in the lake. Major efforts to reduce phosphorus loads have been undertaken and significant progress has been made, particularly in reducing loading from dairies. However, since the average annual phosphorus load to the lake currently exceeds the target by about 100 tons per year, significant restoration work remains.

The Lake Okeechobee Program provides overall coordination of restoration efforts for the lake. It includes efforts on key management issues, including the following: reduction of external phosphorus loads to the lake; evaluation of the feasibility of removing in-lake sediments; effective eradication of exotic plants; and implementation of a modified lake regulation schedule. The District has been working with the USACE in evaluating alternative regulation schedules that might allow lower water levels without

significantly impacting water supply. The USACE is finalizing an Environmental Impact Statement recommending a new regulation schedule.

The District is working with the FDEP to update the current permit for District water control structures discharging into Lake Okeechobee. The intent is to guide implementation of measures necessary to reach phosphorus targets throughout the lake. The permit will be updated through a consent order with requirements that include continuation of regulatory programs in the basin; construction of pilot STAs and large-scale, reservoir-assisted STAs; a feasibility study to remove accumulated sediment in the lake; studies and data collection to reduce modeling uncertainty; and continued research and monitoring. To accomplish these activities, the District modified its Lake Okeechobee Program, beginning in FY2000, in order to expedite initiation of the required actions.

The USACE and the District are continuing programs to control *melaleuca* in Lake Okeechobee. The District is also researching methods to control torpedo grass. When this research is complete, the FDEP will assist in implementation of the recommended treatment methods.

Everglades and Florida Bay Restoration

Everglades and Florida Bay restoration involves the implementation of the ECP, the Everglades Stormwater Program, the C-111 Project, the Modified Water Deliveries Project, and other aspects of research and management for the Everglades and Florida Bay ecosystem separate from the CERP. Several of these projects derive from the Everglades Forever Act. That act, passed by the Florida Legislature in 1994, is a comprehensive approach to restoration, relying on a combination of construction, land acquisition, regulation, and extensive research and monitoring. Research provides the foundation for understanding and preserving the Everglades ecosystem and restoration efforts are intended to provide nutrient levels in the system that will not adversely impact native Everglades flora and fauna.

Everglades Construction Project

The ECP forms the foundation for the largest ecosystem restoration program in the history of Florida. The ECP is composed of 12 interrelated construction projects located between Lake Okeechobee and the Everglades. The cornerstone of the ECP is a group of six large constructed wetlands totaling over 47,000 acres. These STAs will use natural biological and geological processes to reduce the levels of phosphorus that enter the Everglades to an interim goal of 50 parts per billion (ppb). The Everglades Nutrient Removal (ENR) project, which is a prototype STA, has been operating for three years and is effectively reducing phosphorus levels below 25 ppb. In addition to the STAs, the ECP contains four hydropattern restoration projects that will improve the volume, timing, and distribution of water entering the Everglades. Construction began in 1997, and the last of the STAs is scheduled to be complete in October 2003, with ancillary facilities completed by 2006. The local share of design, construction, and land acquisition costs for the ECP is estimated to be approximately \$506 million. When combined with the federal share of

\$190 million, this brings the total estimate of capital costs to \$696 million through 2006. The operation and maintenance of the ECP is anticipated to cost \$133 million through 2014. This brings the total estimated cost of the project to \$829 million. As of September 30, 1999, approximately \$314 million had been expended for the ECP of which \$280 million was nonfederal.

Everglades Stormwater Program

The Everglades Stormwater Program (formerly known as the Non-ECP initiative) was mandated by the 1994 Everglades Forever Act. The purpose of this program is to ensure that water quality standards are met by the end of 2006 at all structures that the District controls and pumps water into, within, or from the Everglades Protection Area, which are not within the ECP. The basins discharging through these structures include existing urban, agricultural, and Indian reservation lands. Compliance with water quality standards will be achieved through implementing the Non-ECP permit, water quality monitoring, water quality improvement strategies, and solutions such as Best Management Practices (BMPs) or construction projects. Other components of the program include a public education campaign and developing a method for reimbursement of expenditures through a special assessment authorized by the Everglades Forever Act.

C-111 Project

The C-111 Project consists of both structural and nonstructural modifications to the existing components of the C&SF Project within the C-111 Basin that promote more natural hydroperiods in Taylor Slough (a freshwater source for Florida Bay) and the eastern panhandle ecosystems of Everglades National Park. The C-111 Project modifications will be designed and operated to store and disperse the flows of water needed for Taylor Slough restoration. This will assist in Florida Bay restoration, as the bay's decline has been associated with a long-term increase in salinity that resulted from the diversion of fresh water away from Florida Bay via the C&SF Project canal system. Land acquisition, design, construction, and operation for the C-111 Project will be undertaken by the District and the USACE under the terms and conditions agreed to in the C-111 Project Cooperative Agreement entered into in January 1995. The USACE is authorized by the Water Resource Development Act (1996) to consider state water quality standards and add water quality features as needed. Total cost is estimated at \$147 million. The District is currently obliged to pay 20 percent of construction and 100 percent of land acquisition costs.

Modified Water Deliveries Project

The Everglades National Park Protection and Expansion Act passed by Congress in 1989 authorized the USACE to modify the C&SF Project to improve freshwater deliveries to ENP via Shark River Slough (along with Taylor Slough, the only sources of fresh water for Florida Bay). The Modified Water Deliveries project that resulted from this legislation includes construction of gated culvert structures, concrete headwall structures, spillways, raising a portion of the Tamiami Trail, and flood mitigation of the

8 1/2 square mile area. Total cost of the Modified Water Deliveries Project is estimated at \$110 million.

The Comprehensive Everglades Restoration Plan (Restudy Implementation)

The C&SF Project provides water supply and flood protection for the District. South Florida's hydrology is now largely governed by a man-made system superimposed on the natural one. Although it has provided for urban and agricultural uses since its inception in 1948, the C&SF Project and the greater-than-expected growth and development that has ensued have unintentionally resulted in extensive damage to the South Florida environment. Over half of the original Everglades have been destroyed and the damage continues. Water is sent to tide through events such as the very wet spring of 1998, involving over 1.4 million acre-ft of emergency Lake Okeechobee flood control releases to the Caloosahatchee and St. Lucie estuaries. These releases caused major environmental, economic, and human impacts in those estuaries and later resulted in a subsequent need for the lost water as the region headed into drought conditions. Without a change to the current design and operation of the C&SF Project, forecasts project the continued loss of uplands; degradation of wetlands, estuaries, and aquatic life; increased water shortages for agricultural and urban uses; increased flooding; and the loss or forced movement of wellfields.

In 1992, Congress authorized the USACE to undertake a reexamination or restudy of the C&SF Project. The purpose of the C&SF Project Comprehensive Review Study (Restudy) was to determine the means by which the C&SF Project can be modified to restore the South Florida ecosystem, while providing for the other water-related needs of the region. The USACE and the District jointly developed a Project Study Plan for the Restudy, which was approved by the District's Governing Board in July 1995, to provide guidance for all subsequent phases of the Restudy. It was amended in May 1997, following the Water Resources Development Act of 1996. The USACE and the District established a series of interagency Restudy teams that began developing and commenting on Restudy alternatives. This effort started in September 1997 and culminated in June 1998 with the selection of an Initial Draft Plan. On October 15, 1998, the *Central and Southern Florida Flood Control Project Comprehensive Review Study Draft Integrated Feasibility Report and Programmatic Environmental Impact Statement* (USACE and SFWMD, 1998), which contains the recommended comprehensive plan, was released and the USACE and the District immediately began a series of 12 public meetings throughout South Florida to actively solicit public comment on the plan. The *Central and Southern Florida Flood Control Project Comprehensive Review Study Final Integrated Feasibility Report and Programmatic Environmental Impact Statement* (USACE and SFWMD, 1999) was completed in April 1999 and submitted to Congress on July 1, 1999.

The keys to Everglades restoration have been determined in the Restudy to be increase the amount of water available, ensure adequate water quality, and reconnect the parts of the system. A key aim is to annually regain, for beneficial use, about two million acre-feet of excess water currently being discharged to tide for flood control.

The recommendations made within the Restudy (i.e. structural and operational modifications to the C&SF Project) are being further refined and will be implemented in the Comprehensive Everglades Restoration Plan (CERP). The CERP is intended to be a retrofit and environmental remediation program to satisfy both the needs of the natural system and to provide water supply, flood protection, and quality water for South Florida users. The estimated cost of implementing the recommended CERP is \$7.8 billion over approximately 25 years, with an annual operation, maintenance, and monitoring cost of \$175 million. The CERP is being equally funded by the State of Florida and the federal government.

Comprehensive Everglades Restoration Plan Goals

The overall goal of the CERP is to enhance ecologic and economic values and social well being. Specific goals which will enhance ecologic value are as follows:

- Increase the total spatial extent of natural areas
- Improve habitat and functional quality
- Improve native plant and animal species abundance and diversity

Specific goals which will enhance economic values and social well being are as follows:

- Increase availability of fresh water (agricultural/municipal and industrial)
- Reduce flood damages (agricultural and urban)
- Provide recreational and navigational opportunities
- Protect cultural and archaeological resources and values

Comprehensive Everglades Restoration Plan Issues

The Restudy identified the following major issues involving the current C&SF Project:

- Too much water is sent to tide
- Estuaries often suffer
- Lake Okeechobee is treated like a reservoir
- The Everglades is not receiving the historic timing and flow of water
- Florida Bay lacks fresh water
- Water quality has deteriorated
- Urban and agricultural water supplies are dwindling
- Flood protection must be maintained

In response to these identified issues, the Restudy was developed to increase South Florida's water supply, while improving water deliveries to its remaining natural areas. The Restudy recommends the following modifications to the existing C&SF Project (USACE and SFWMD, 1999):

Developing Surface Water Storage Reservoirs. A number of water storage areas will be located north of Lake Okeechobee, in the Caloosahatchee and St. Lucie basins, in the EAA, and along western Palm Beach, Broward, and Miami-Dade counties. These areas will store 1.5 million acre-feet of water so that it is not sent to tide.

Creating Water Preserve Areas. Multipurpose water management areas are planned in Palm Beach, Broward, and Miami-Dade counties between urban areas and the eastern Everglades. The Water Preserve Areas will have the ability to treat urban runoff, store water, reduce seepage, and improve existing wetland areas.

Managing Lake Okeechobee as an Ecological Resource. Lake Okeechobee is presently managed for many, often conflicting, uses. The lake's regulation schedule will be changed to reduce the extreme high and low levels that harm the ecology of the lake and its shoreline.

Improving Water Deliveries to Estuaries. Excess rainwater that is discharged to the sea through the Caloosahatchee and St. Lucie rivers is very damaging to the estuary ecology. The recommended plan will greatly reduce these discharges by storing excess rain water in surface and underground water storage areas. In addition, during times of low rainfall, stored water can be retrieved to augment the estuaries.

Developing Underground Water Storage. More than 300 wells will be built to reach the Floridan aquifer. As much as 1.6 billion gpd may be pumped through the wells into underground storage zones. The injected fresh water forms a bubble within the existing underground salt water, and can remain in the same condition in which it was injected for years. During dry times it can be pumped out. This approach, known as Aquifer Storage and Recovery, or ASR, has been used for years on a smaller scale to augment municipal water supplies. A significant amount of water in surface reservoirs is lost through evaporation, and a major advantage of ASR is that water does not evaporate when it is underground. The recommended plan includes 200 wells around Lake Okeechobee, as well as others in the Water Preserve Areas and the Caloosahatchee Basin.

Developing Treatment Wetlands. About 30,000 acres of STAs, will be built to treat urban and agricultural runoff water before it is discharged to natural areas. These are in addition to the over 40,000 acres of man-made wetlands already being constructed to treat water discharged from the EAA.

Sending Water to the Everglades in a Way That Mimics Nature. Additional changes will be made to the rainfall-driven operational plan to improve the timing of water sent to the WCAs and Everglades National Park.

Removing Barriers to Sheetflow. More than 240 miles of C&SF Project canals and levees will be removed to reestablish the natural sheetflow of water through the Everglades. Most of the Miami Canal in WCA-3 will be removed. Twenty miles of the Tamiami Trail (U.S. 41) will be rebuilt with bridges, allowing water to flow as a sheet into Everglades National Park, as it once did naturally. In the Big Cypress Preserve, a north-south levee will be removed to restore some natural overland water flow.

Storing Water in Quarries. Two limestone quarries in northern Miami-Dade County will be converted to water storage reservoirs to supply Florida Bay, the Everglades, and Miami-Dade County residents with water. The area will be ringed with an underground wall to ensure that stored water does not leak.

Reusing Wastewater. The recommended plan includes two advanced wastewater treatment plants in Miami-Dade County. The plants will be capable of making more than 220 mgd of the county's treated wastewater clean enough to discharge into wetlands along Biscayne Bay, and improve water supplies to southern Miami-Dade County and northeastern Shark River Slough (part of the Everglades).

Improving Water Deliveries to Biscayne Bay. The recommended plan will protect and restore Biscayne Bay coastal wetlands and treat storm water runoff before it enters the bay.

Improving Freshwater Flows to Florida Bay. Improved water deliveries to Shark River Slough, Taylor Slough, and the wetlands to the east of the Everglades National Park will send more fresh water to Florida Bay

INFRASTRUCTURE PROJECTS

The District, through the Restudy, has identified a series of water management infrastructure projects (**Figure 19**) that are necessary to accomplish these six major District priorities.

Legend for Figure 19 - Infrastructure Requirements

1. Kissimmee River Restoration
2. North of Lake Okeechobee Storage Reservoir
3. Caloosahatchee Estuary Water Supply
4. Caloosahatchee Reservoir with ASR and Caloosahatchee Backpumping with STA
5. Taylor Creek/Nubbin Slough Storage Reservoir and Treatment Area
6. Indian River Lagoon Water Preserve Areas: Storage in the C-23, C-24, C-25, C-44, N. and S. Fork Basins
7. Revised Lake Okeechobee Regulation Schedule
8. St. Lucie Estuary Water Supply
9. Lake Okeechobee ASR
10. L-8 Project
11. WCA-1 Internal Canal Structures
12. STA Construction
13. EAA Storage Reservoirs
14. Modify G-404 and S-140 Pumps
15. Water Preserve Areas: Aboveground Storage, ASR, and Seepage Management
16. Big Cypress/L-28 Interceptor Modifications
17. Partial Decompartmentalization of WCA-3 and Everglades National Park
18. LEC Water Conservation and Broward County Secondary Canals Improvements
19. Miami-Dade Utility ASR
20. Water Preserve Areas: North and Central Lake Belt Storage Areas
21. Everglades Rain-Driven Operations
22. Modified Water Deliveries
23. West and South Miami-Dade County Reuse
24. L-31N Levee Improvements for Seepage Management
25. Biscayne Bay Coastal Wetlands
26. C-111 North Spreader Canal
27. Florida Bay Restoration and Other C-111 Projects
28. Southern Golden Gate Estates Hydrologic Restoration
29. Golden Gate Canal Improvements and ASR
30. Lake Trafford Restoration
31. Henderson Creek Spreader Canal and Improvements
32. Camp Keis Strand Restoration
33. WCA-2A Hydropattern Restoration
34. WCA-3A Hydropattern Restoration
35. Henderson Creek Improvements
36. Ten Mile Creek Project

Other Major Projects (not shown on the map)

Water Resource Development

Critical Restoration Projects

Alternative Water Supply

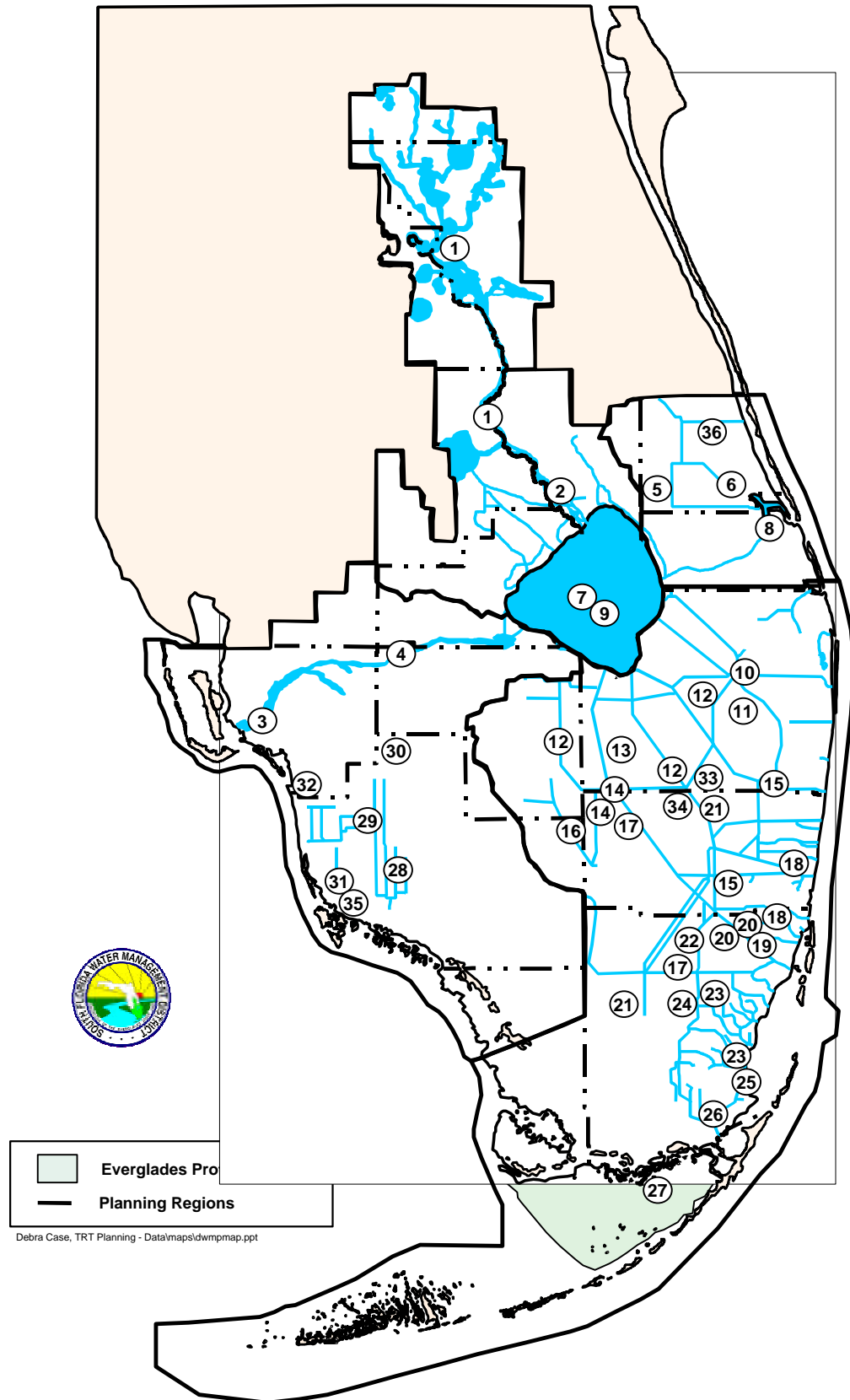


Figure 19. Water Management Infrastructure Needed to Accomplish SFWMD Priorities.

DISTRICT AND OTHER PUBLICLY OWNED LAND

The District is a major landholder in South Florida. It also participates in the protection and preservation of other major public holdings within its boundaries. These public holdings include Everglades National Park, Biscayne Bay National Park, Big Cypress National Preserve, the WCAs, J.W. Corbett Wildlife Management Area (WMA), DuPuis Reserve, Three Lakes WMA, Avon Park Bombing Range, and the Disney Preserve (Walker Ranch).

One of the most important natural resources for the District is the remaining Everglades. This nationally significant resource includes Everglades National Park and the WCAs. The expanse and geographic distribution of these public lands make them key tools for preserving important water resource corridors throughout the District (**Figure 20**). These corridors include major wetland systems and important rivers and sloughs. Many of these wetlands and environmentally sensitive upland areas are associated with rivers or natural flowways such as the Kissimmee and Loxahatchee rivers.

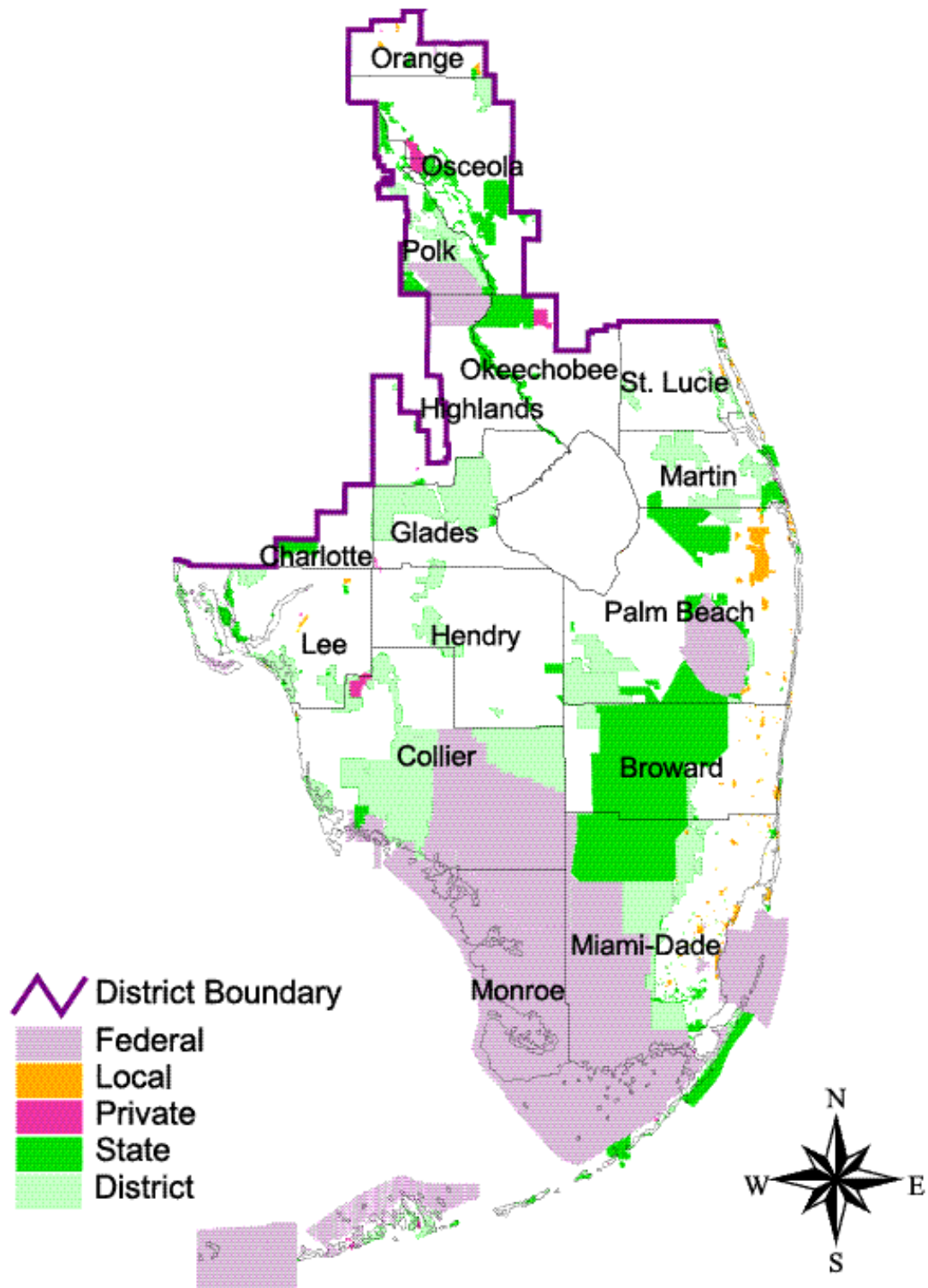


Figure 20. Public Land Ownership within the SFWMD.

